



Intra-Placental Twin Pair: Ultrasonographic Mirror-Image Artifact

İntra-Plasental İkiz Eşi: Ultrasonografik Ayna Artefaktı

Mirror-Image Artifact

Mekin Sezik
Süleyman Demirel University Faculty of Medicine, Department of Obstetrics and Gynecology, Isparta, Turkey

Presented as a video presentation at the 8th Obstetrics and Gynecologic Ultrasonography Congress, 26-30 September, 2012, Fethiye, Turkey

Özet

Yirmi sekiz yaşında 22 haftalık dikoryonik diamniyotik ikiz gebeliğin rutin antenatal ultrason muayenesinde, posterior plasenta içinde hareket eden bir "fantom fetus" göze çarpmaktaydı. Bu görünümün ayna artefaktı olduğu ve amniyon keseleleri arasında serbest hareket halindeki ikizler arası zarın da yansıtıcı yüzeyi oluşturduğu sonucuna varıldı. Obstetrik sonografi esnasında bu şekilde fantom görüntülerin ortaya çıkabileceği akılda tutulmalıdır.

Anahtar Kelimeler

Artefaktlar; Prenatal Ultrasonografi; İkiz Gebeliği

Abstract

During the routine antenatal ultrasound scan of a 28-year-old woman at 22 weeks' gestation with a dichorionic diamniotic twin pregnancy, a "moving phantom fetus" was evident within the posterior placenta. It was concluded that the image was a mirror-image artifact with the freely floating inter-twin membrane between the amniotic sacs, comprising the reflective surface. The possibility of such phantom images during obstetric sonography should be considered.

Keywords

Artifacts; Prenatal Ultrasonography; Twin Pregnancy

DOI: 10.4328/JCAM.1343

Received: 18.10.2012 Accepted: 07.11.2012 Printed: 01.03.2016

J Clin Anal Med 2016;7(2): 247-9

Corresponding Author: Mekin Sezik, Süleyman Demirel Üniversitesi Tıp Fakültesi, Kadın Hastalıkları ve Doğum Anabilim Dalı 32260, Çünür, Isparta, Türkiye.

T.: +90 2462119239 E-Mail: msezik@yahoo.com

Introduction

Various artifacts are encountered with a relatively common incidence during clinical ultrasound. The obstetric ultrasound is by far not free from these artifacts, as well. Although mirror-image artifacts are well-recognized and acknowledged in the medical ultrasound literature [1-3], such phantom images have rarely been defined during fetal ultrasound imaging [4].

In the current report, the findings of the mirror-image artifact of one of the fetuses in a dichorionic-diamniotic (DCDA) twin pregnancy were defined. The appearance of the “phantom fetus” within the posteriorly located placenta proved the artificial nature of the image.

Case Report

A 28-year-old woman (gravida 1, para 0) presented for routine detailed ultrasound scan at 22 weeks' gestation. Previous ultrasound examinations at 9 and 13 weeks were in line with a DCDA twin pregnancy. The anatomy scan at the first trimester (13 weeks) was normal, including nuchal translucency of both fetuses (1.6 and 1.9 mm, respectively).

During the current transabdominal scan at 22 weeks' gestation, the placentae were fused and located posteriorly. The inter-twin membrane was observed to be freely floating between the two amniotic sacs, which had both normal amniotic fluid indices estimated by ultrasound. While, one of the fetuses was being scanned for anatomy, a “moving fetus” was evident within the posterior placenta. The fetal image within the placenta appeared and moved about synchronously with the snake-like floating motion of the inter-twin membrane, which was in the same transverse plane of the ultrasound transducer (Figure 1). Hyperechogenic spots on the membrane, emerging with its floating movements among the amniotic sacs, were also observed (Figure 2). This phantom appearance was consistent with an ultrasonographic mirror-image artifact.

Discussion

Medical ultrasonography utilizes high-frequency sound waves, which behave relatively similar to light rays. Therefore, physical rules pertaining to optics can be applied to ultrasonographic waves. One of the characteristics of light rays, and therefore ultrasound waves, is its reflective properties. Ultrasound images are formed by the reflecting beam, which is produced and subsequently detected by the transducer of the instrument. The time-lapse for the reflection of a specific beam enables the ultrasound software to calculate and plot the image at the relevant depth on the image display.

As Sandler et al stated [5], “If sound waves are reflected by a highly reflective and extended (specular) curved surface, the sound signal is scattered and some would not directly return to the transducer”. This is called a multi-path reflection and forms the basis of an ultrasonographic mirror-image artifact.

The diaphragm-lung interface is a typical example for the curved surface. Hence, mirror images are rather common during abdominal, specifically hepatic, ultrasound imaging [6]. The liver parenchyma and gall bladder can be mirrored into the thorax mimicking a diaphragmatic hernia with liver present in the thorax [5].

Although such incidents can be encountered in infants and



Figure 1. The skeletal structures of the artifactual fetal image are evident (shown by an arrow). Note the “blinking” hyperechogenic spots (shown by stars) on the inter-twin membrane, secondary to ultrasound waves reflecting over the freely moving curved membrane.

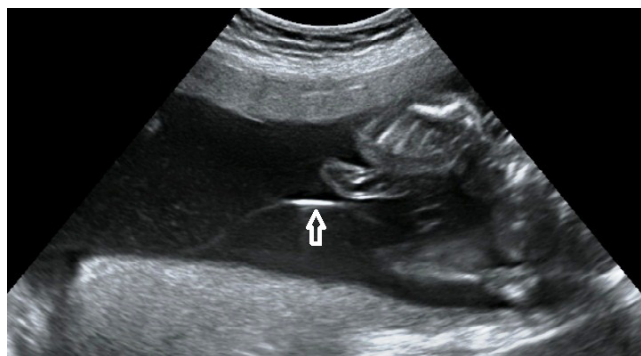


Figure 2. Close-up view of the echogenic contour noticeable on the inter-twin membrane (shown by the arrow). The ultrasound waves are reflected inappropriately from this curved structure and scattered back to the transducer. This increases the distance travelled by the waves and leads the ultrasonographic software into error.

children, reports of phantom mirror images are scant during obstetric imaging of the fetus. Lim et al [4] described a transabdominal sonography showing an intrauterine 12-week-pregnancy accompanied by two bilateral phantom “extrauterine pregnancies”. Transvaginal ultrasound showed a single active fetus, and the pregnancy subsequently progressed uneventfully to a normal singleton term delivery. The authors proposed that the psoas muscles posterior to the uterus during the transabdominal scan have acted as a mirror to the ultrasound.

In our case, the floating inter-twin membrane was probably the reflective surface. The “blinking” hyperechogenic spots on the membrane were secondary to ultrasound waves reflecting over the curved membrane, as it moved freely across the amniotic sacs. It was interesting to notice that those echogenic spots were intermittently appearing synchronously with the appearance of the moving phantom fetus duplicated into the posterior placenta. The spine and ribs of the artifactual fetus were more evident, in line with increased reflection of the hyperechogenic elements, i.e. the skeletal parts.

Clues for the identification of mirror-image artifacts include discordance among the displayed and expected image, appearance of the image at a location outside the body, and lack of displacement or distortion of the structures in the region [2]. In the current case, it was concluded that the image was an arti-

fact, as there was obviously lack of correlation with the known anatomy (i.e. the twin pair inside the placenta).

Dealing with artifactual mirror images may be bothersome, and elimination can be difficult. However, adjusting to a higher frequency or changing to a high-frequency probe may be useful. Furthermore, decreasing the energy output was supposed to eliminate the false images [5]. Transvaginal scanning can also be supplementary to decide whether the displayed image is true or phantom.

In conclusion, mirror-image artifacts might be encountered during fetal ultrasound examinations especially in the presence of a reflective structure such as the relatively thick inter-twin membrane in DCDA multiple pregnancies. One should bear in mind the possibility of such phantom images during obstetric scans.

Competing interests

The authors declare that they have no competing interests.

References

1. Cakmakci H, Gulcu A, Zenger MN. Mirror-image artifact mimicking epidural hematoma: usefulness of power Doppler sonography. *J Clin Ultrasound* 2003;31(8):437-9.
2. Feldman MK, Katyal S, Blackwood MS. US artifacts. *Radiographics* 2009;29(4):1179-89.
3. Mihmanli I, Cetinkaya S, Kurugoglu S, Kantarci F, Esen G. Another face of mirror-image artifact. *Eur J Ultrasound* 2001;14(2-3):183-5.
4. Lim BH, Amos M, Fairhead AC. The mirror image artifact of early pregnancy. *Ultrasound Obstet Gynecol* 2003;21(5):518-20.
5. Sandler MA, Madrazo BL, Walter R, Beute GH, Hudak SF, Hagggar AH, et al. Ultrasound case of the day. Duplication artifact (mirror image artifact). *Radiographics* 1987;7(5):1025-8.
6. Gardner FJ, Clark RN, Kozlowski R. A model of hepatic mirror-image artifact. *Med Ultrasound* 1980;4(1):19-21.

How to cite this article:

Sezik M. Intra-Placental Twin Pair: Ultrasonographic Mirror-Image Artifact. *J Clin Anal Med* 2016;7(2): 247-9.